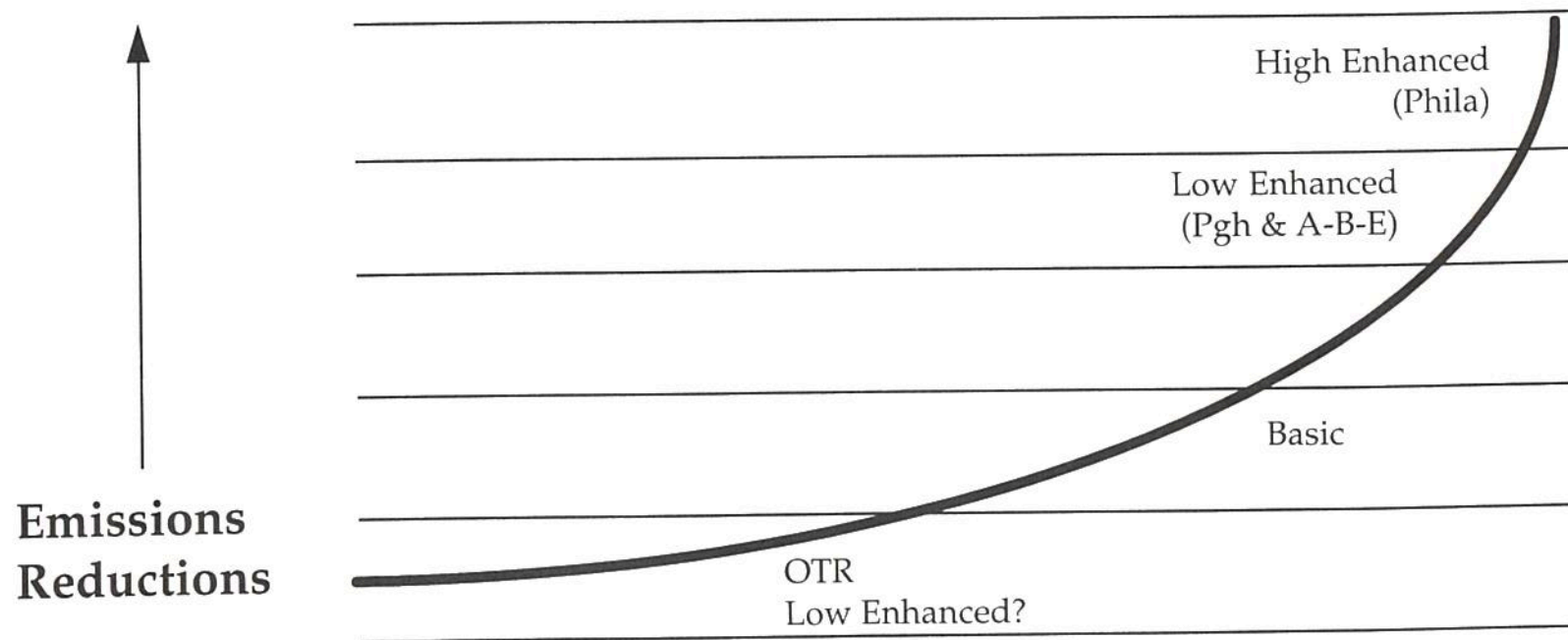


# ***I/M PROGRAM OVERVIEW***

## ***I/M Program Overview***

- Overview of I/M Programs
- High Enhanced I/M Test Components
- Emissions, Vehicle Type & Vehicle Age
- I/M Options for Philadelphia
- Summary

# *I/M Program Types*



Light Duty Cars & Trucks

## ***EPA High Enhanced Performance Standard Programs***

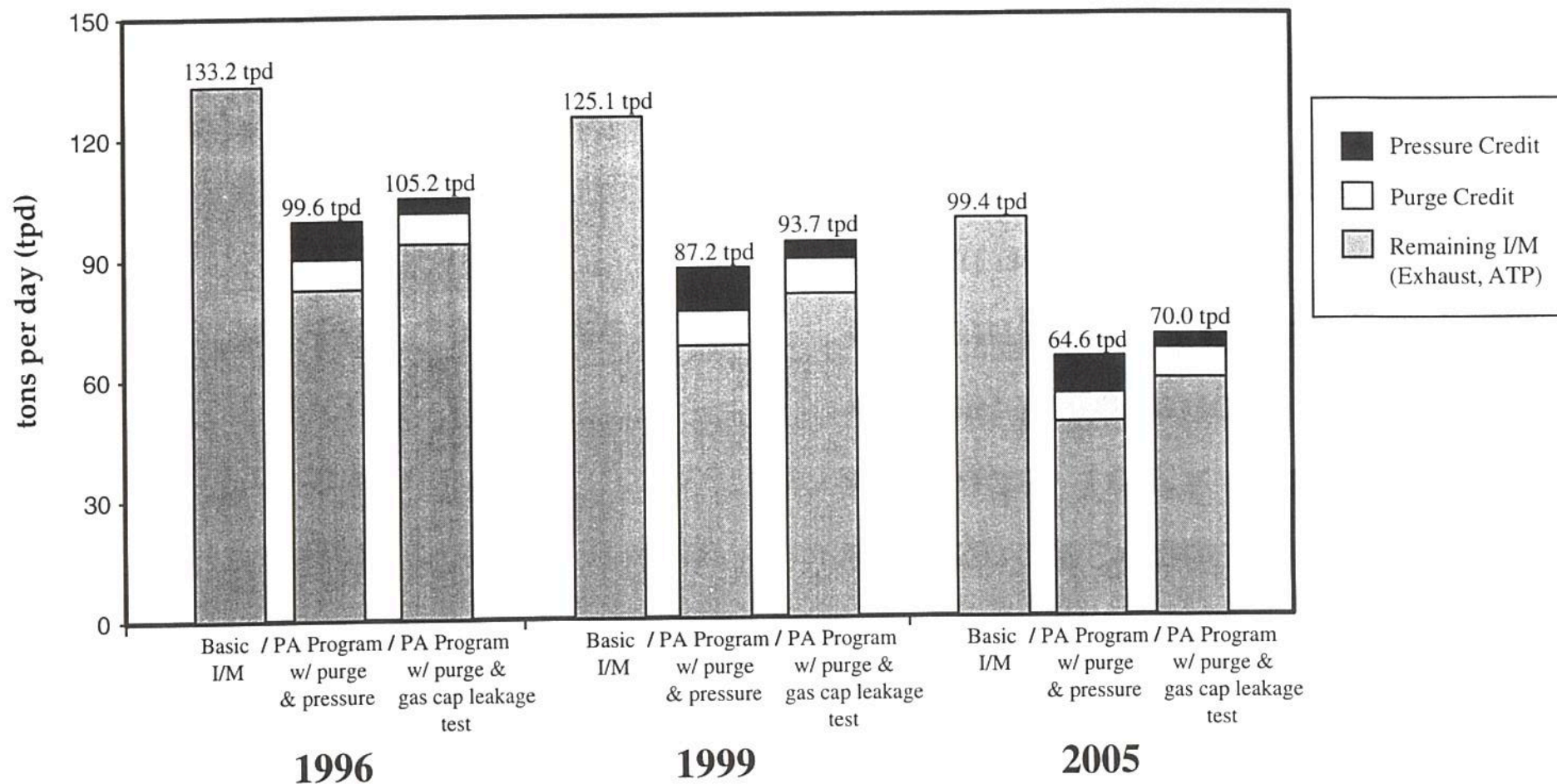
Difference between current program and proposed program will achieve EPA-specified reductions to meet an emissions rate (grams\mile) for:

| <u>Pollutant</u> | <u>Test Years</u> | <u>Approximate Reduction</u> |
|------------------|-------------------|------------------------------|
| VOC's -          | 1999, 2002 & 2005 | - 28%                        |
| NOx -            | 1999, 2002 & 2005 | - 9%                         |
| CO -             | 2001              | - 50%                        |

# ***Performance Standard Determinants***

- Vehicle Fleet
- Program Type
- Network Type
- Vehicle Coverage
- Waiver Rate
- ATP Tests
- Credit for Decentralized Approach
- Remote Sensing
- Model Year Coverage
- Test Frequency
- Compliance Rate
- Cutpoints
- Pressure and Purge Tests
- Program Effectiveness
- Mechanic Training

# Philadelphia 5-County Area VOC Emissions

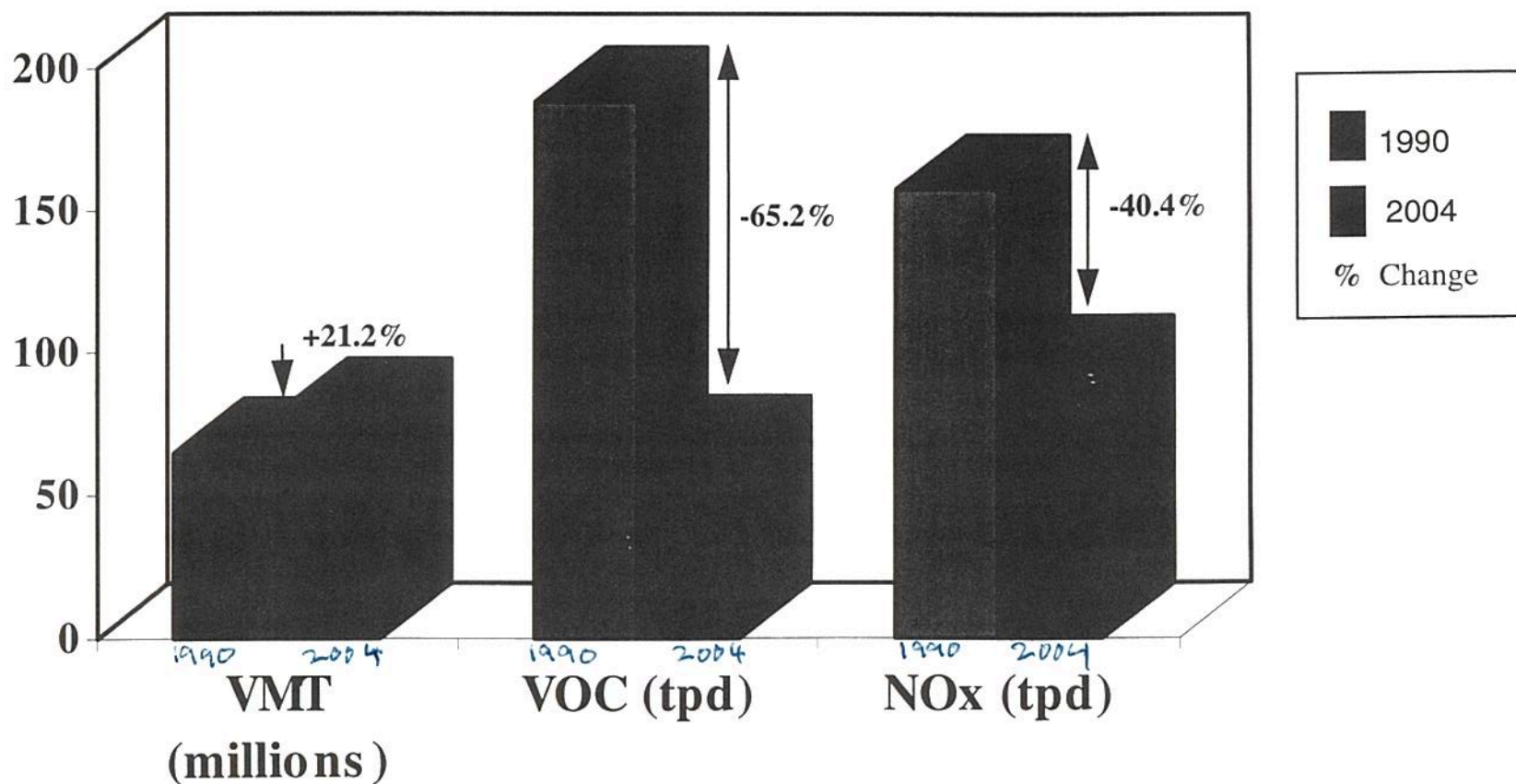


\*\*From MOBILE5a\_H modeling; Reflects interactions among program components

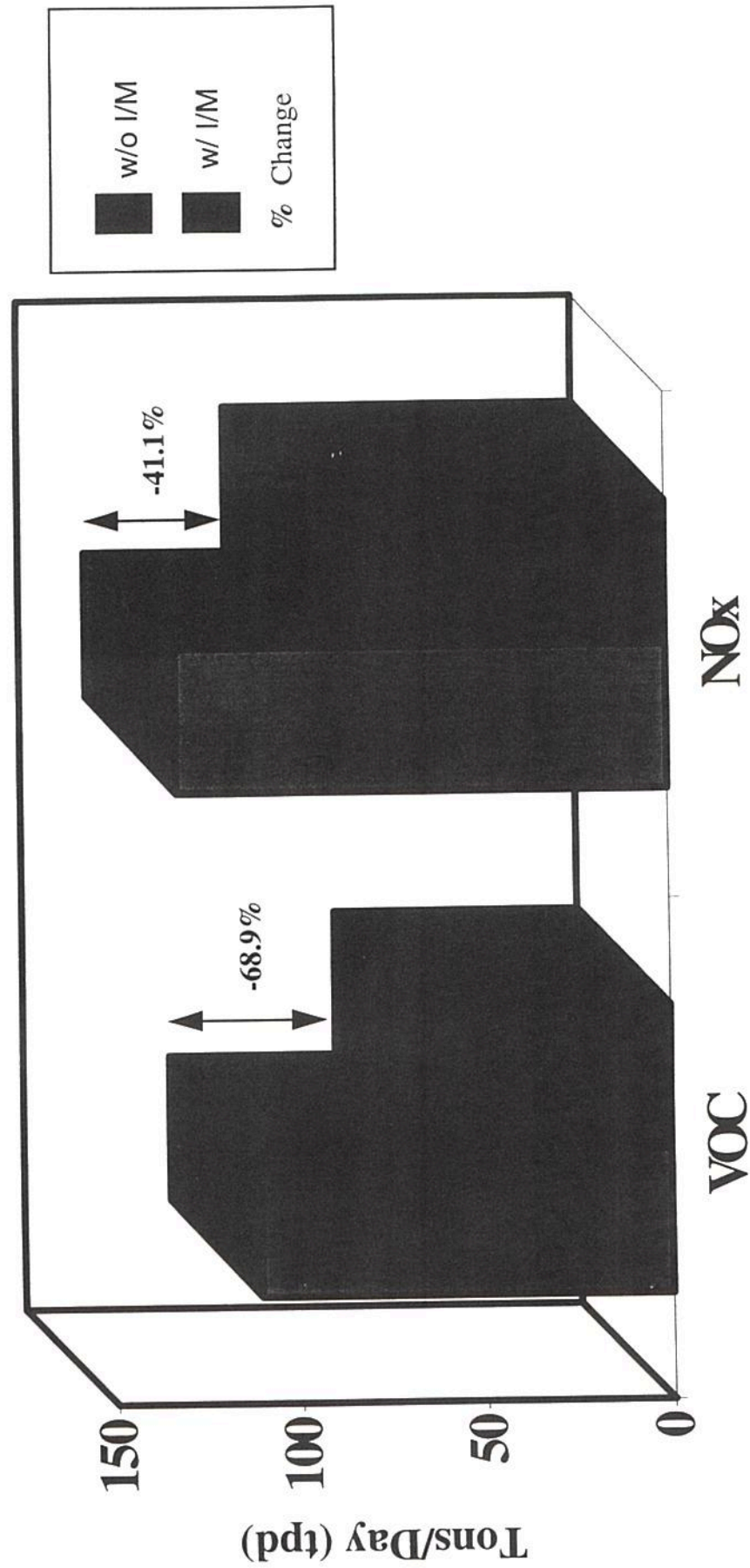


# ***Philadelphia 5-County Area***

## ***Mobile Source Emissions and VMT***



# Philadelphia 5-County Non-Attainment Area 2004 Mobile Source Emissions

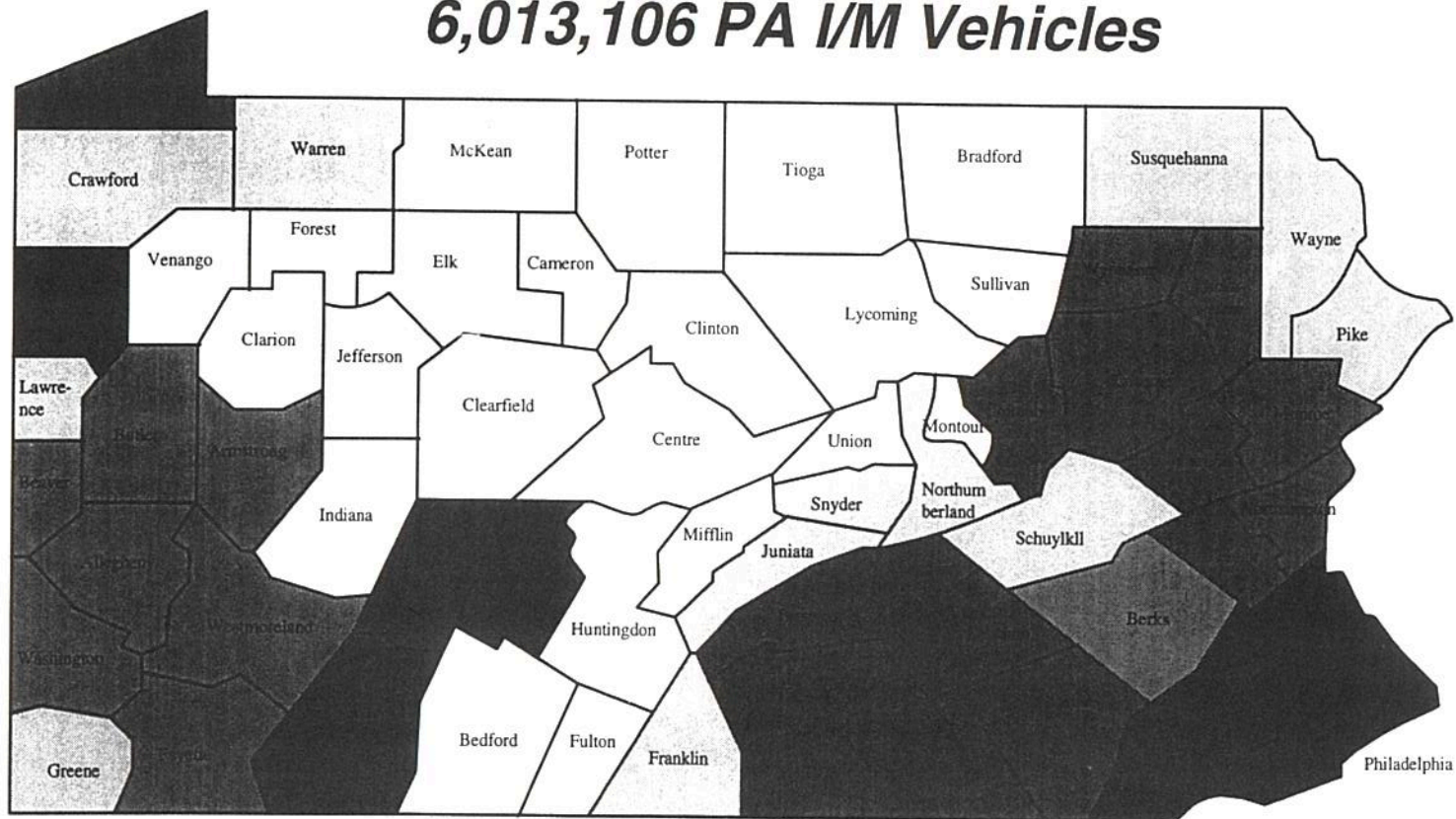




# 1995 LDGV & Trucks Registration Distribution

**7,780,786 Total PA Light Duty Vehicles**

**6,013,106 PA I/M Vehicles**



Key



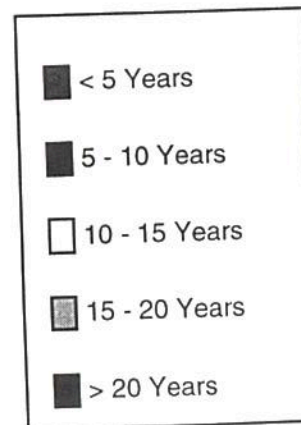
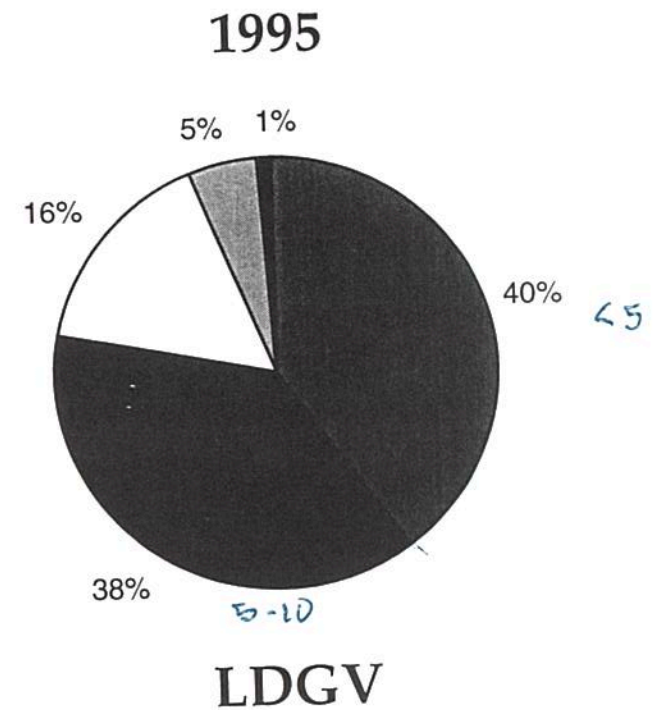
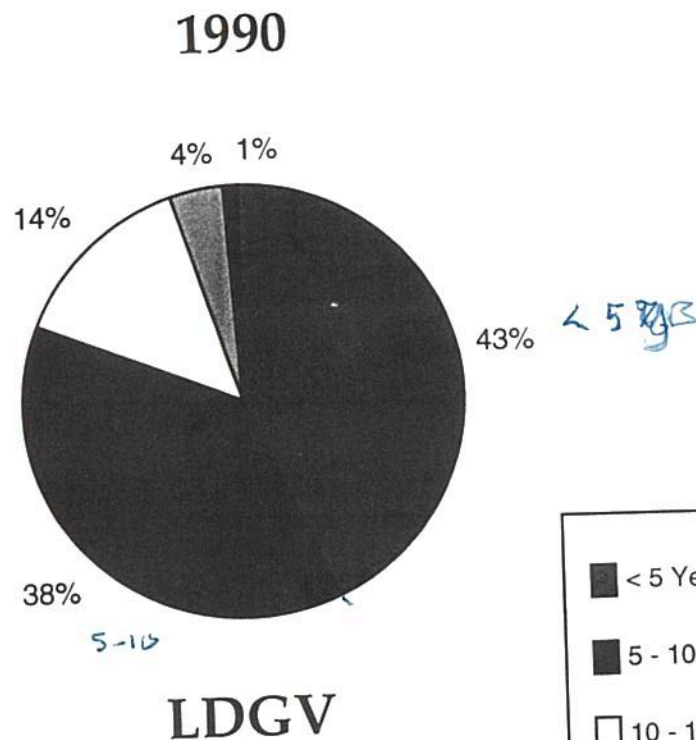
## I/M Counties

Philadelphia 5-County  
Pittsburgh 4-County & Berks  
All Marginal (13 Counties)  
Centre & Lycoming  
Total I/M Counties  
All Others (42 Counties)

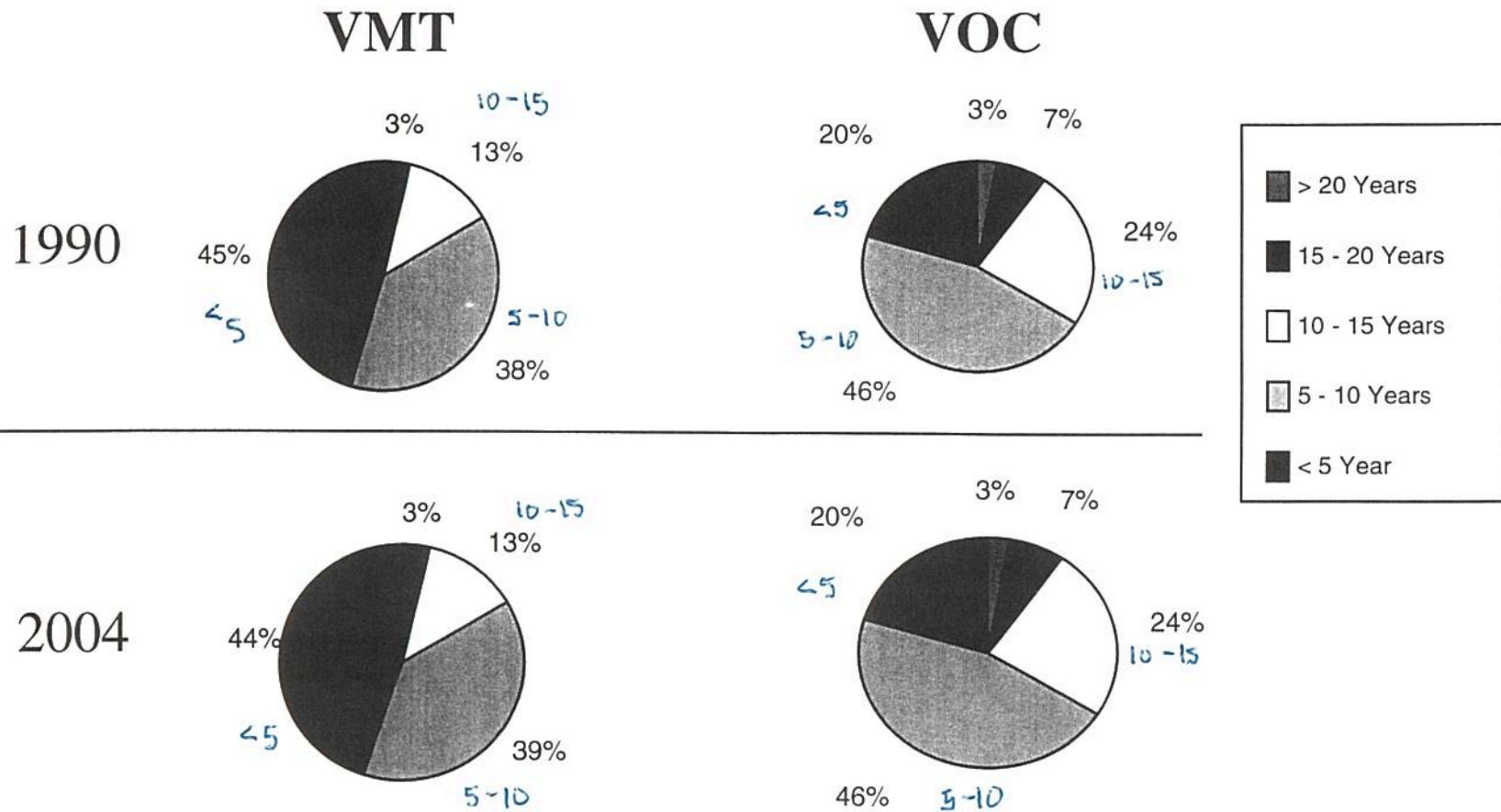
## % PA Vehicles

26.76%  
20.13%  
28.33%  
2.06%  
77.28%  
22.72%

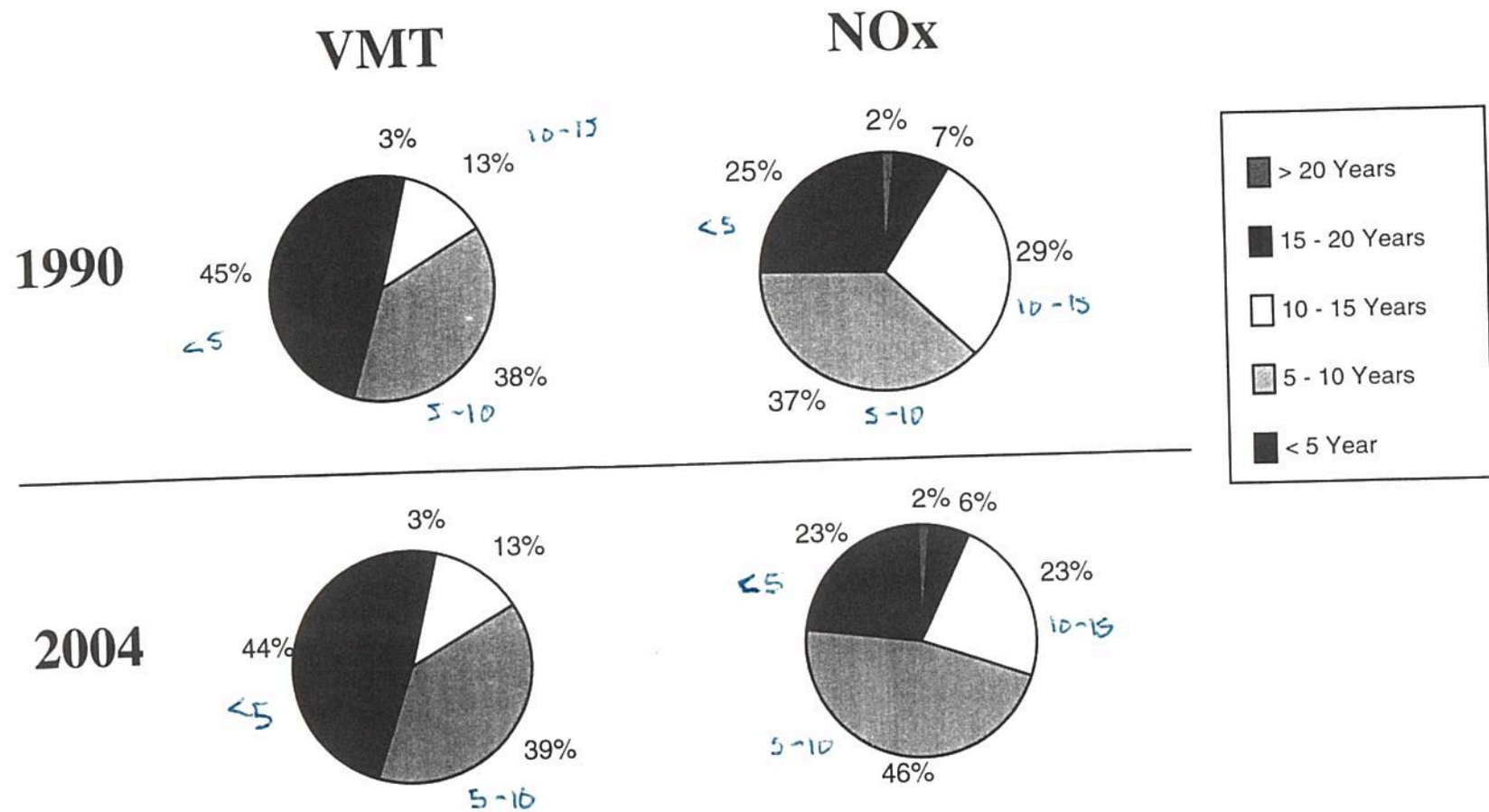
# Philadelphia 5-County Age Distribution for LDGV



# Philadelphia Area VMT and Emissions by Model Year

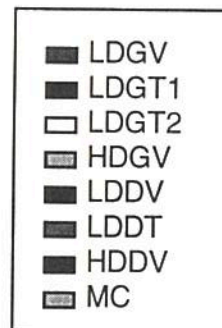
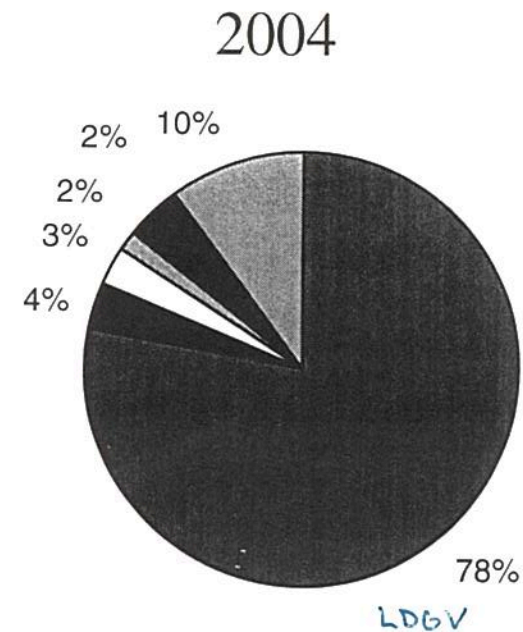
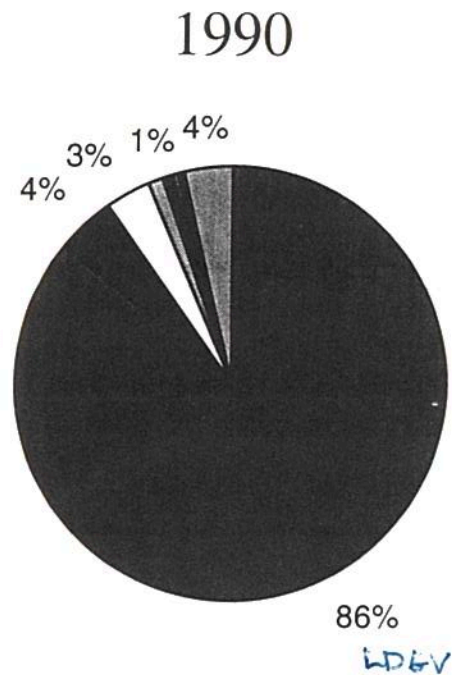


# Philadelphia Area VMT and Emissions by Model Year



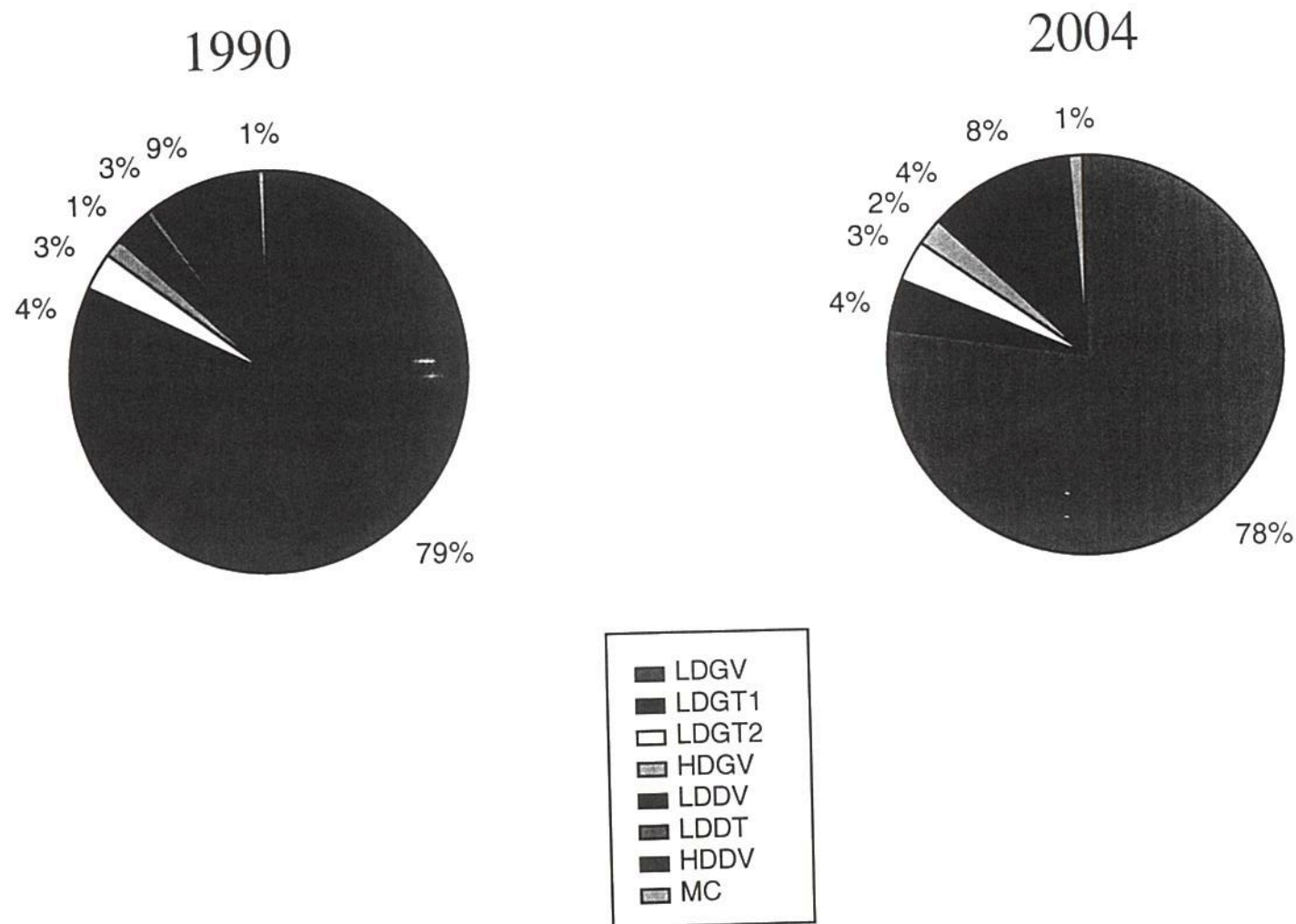


## ***Philadelphia 5 County - VOC Emissions by Vehicle Type***

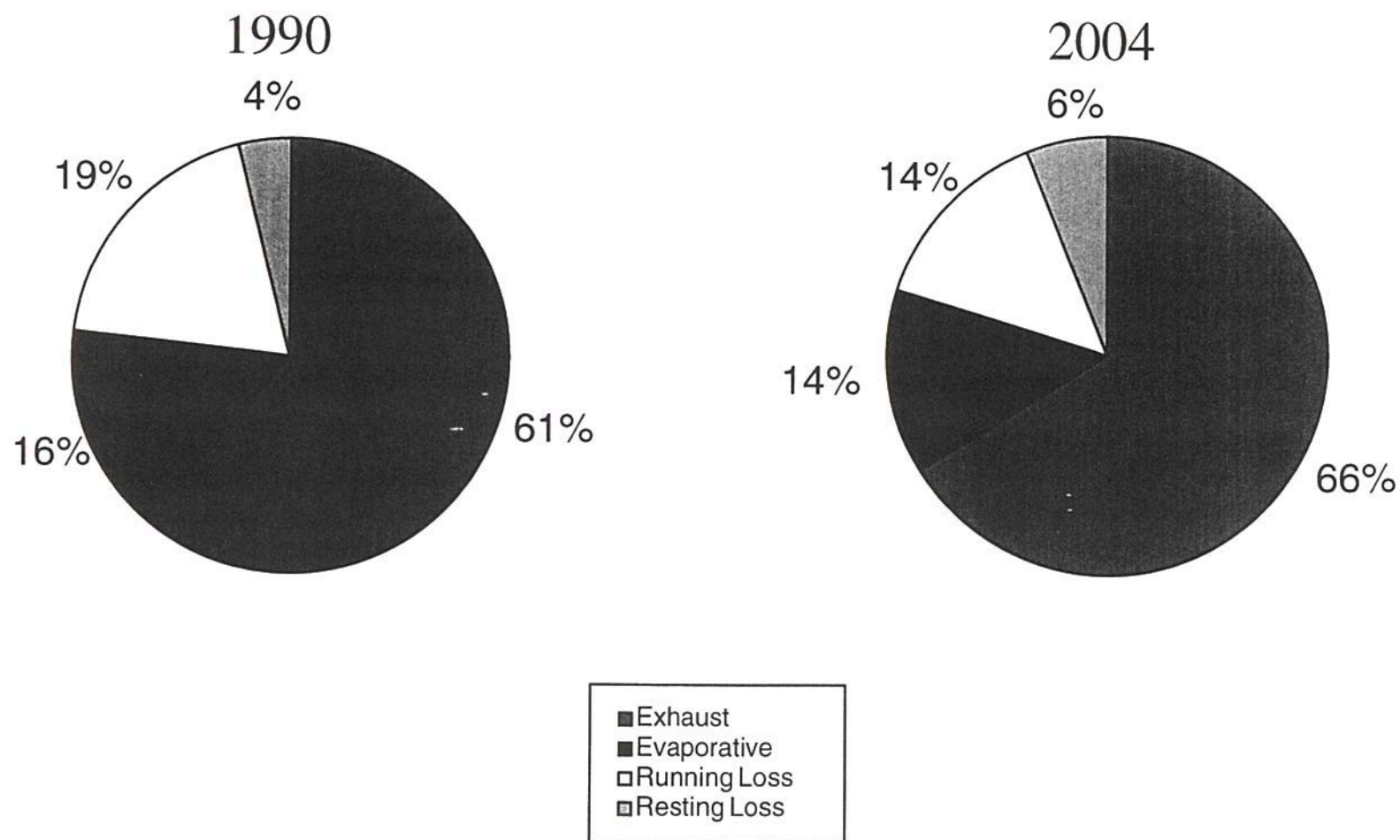




# Philadelphia 5 County - NOx Emissions by Vehicle Type

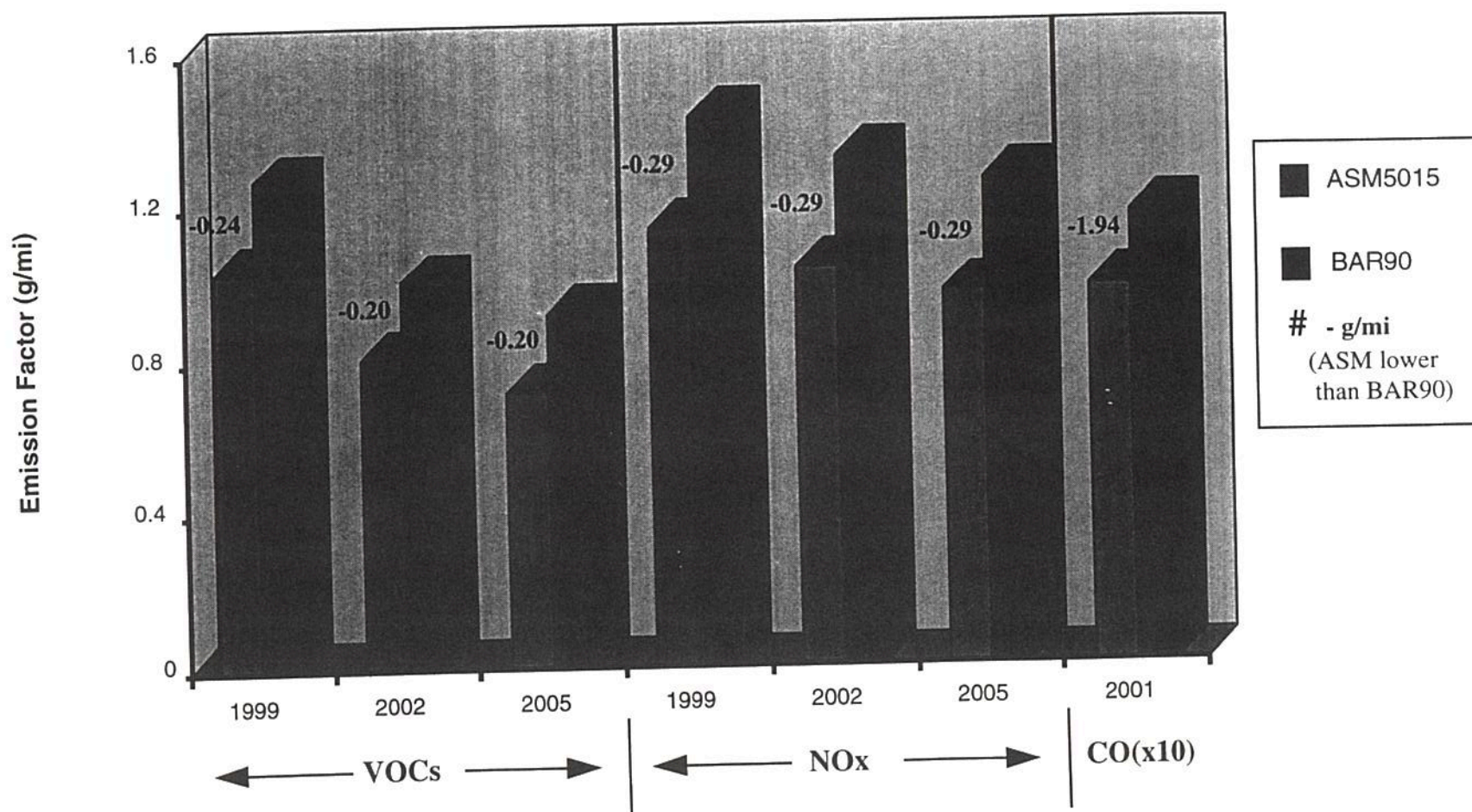


## *Philadelphia 5 County - VOC Emissions by Component*



# ASM5015 - BAR90 Emission Factors

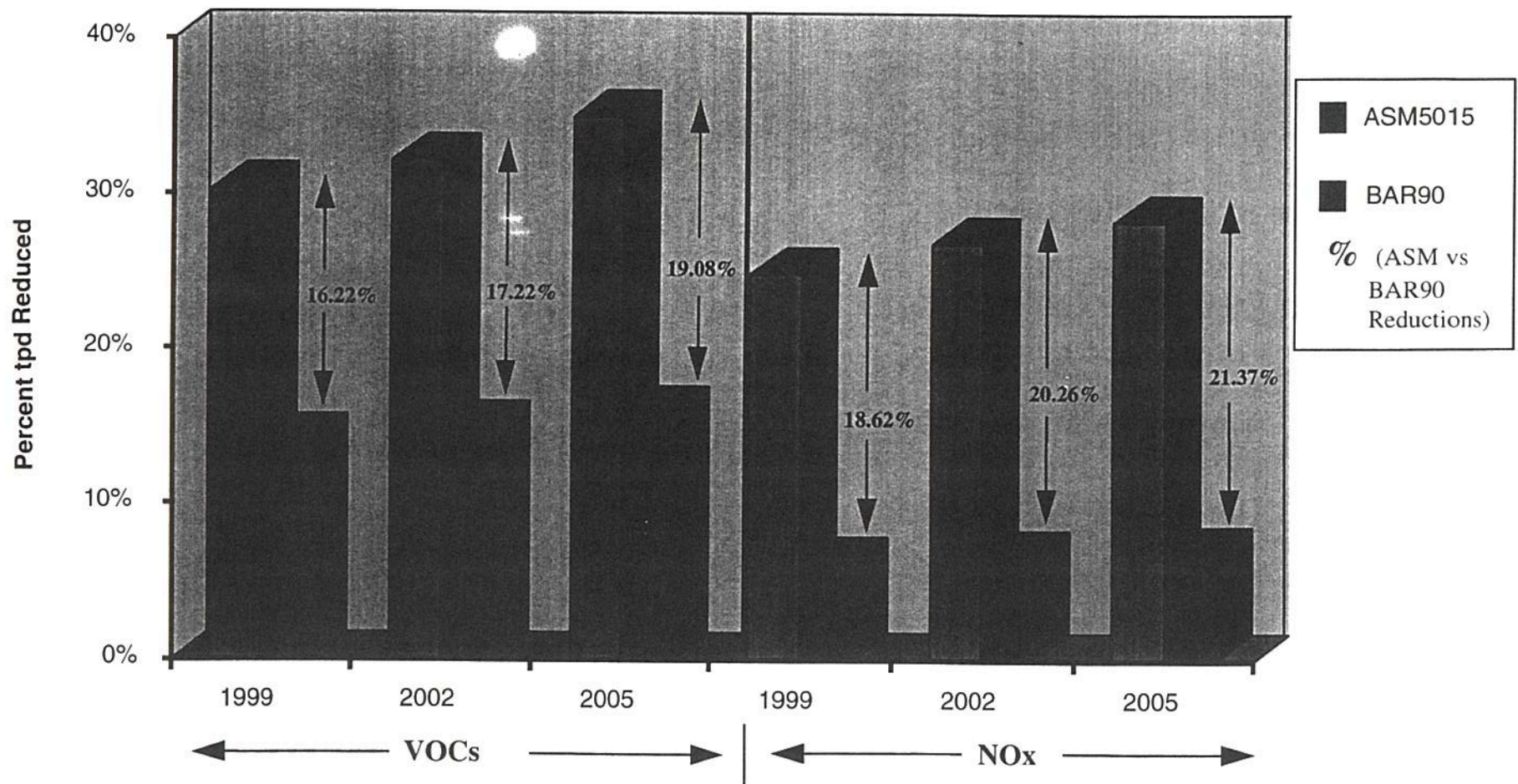
## Philadelphia 5-County Area





# ***ASM5015 - BAR90 Emissions Reduction***

***Philadelphia 5-County Area  
Percent Tons per Day (tpd)***



# ***Possible I/M Options for Philadelphia***

| <u>Option</u>                | <u>1999 VOC Tons/day</u> | <u>Comments</u>                                       |
|------------------------------|--------------------------|---|
| Alt. Pressure Test           | - 6.5                    | Fail performance std.                                 |
| Sub. BAR test for ASM*       | - 20.3                   | Fail performance std.                                 |
| Add HDGV                     | < 1.0                    | Few Vehicles added                                    |
| Add LDDV, LDDT & HDDT        | ?                        | New Test equipment? No emissions credit available     |
| Add more than 25 MYs         | 0                        | No additional credit available                        |
| Increase Compliance rate>96% | ?                        | Enforcement?  |
| Mechanic Training            | ?                        | EPA to issue soon-already promised to claim           |
| Centralized or Hybrid        | 0                        | 100% credit claimed under NHS<br>PA legal prohibition |
| Test upon ownership change   | ?                        | Already testing annually                              |
| Biennial Test Cycle          | ?                        | Fail performance Std                                  |



## ***Possible I/M Options for Philadelphia (Cont'd)***

| <u>Option</u>                     | <u>1999 VOC Tons/day</u> | <u>Comments</u>   |
|-----------------------------------|--------------------------|---|
| More MYs in Pressure & Purge      | 0                        | '81 v '83 pressure; '81 v '86 purge   |
| < Waiver rate < 3%                | ?                        | Enforcement?  |
| Increase waiver threshold > \$150 | ?                        | Motorist resistance; Limited data   |
| Tighten cutpoints                 | ?                        | Standard data at maximum for ASM; Higher Failure rate for pre-1986 vehicles |
| > Remote Sensing                  | 0                        | At current maximum  |

\* Equipment comparison scheduled for '96-'97 pilot program

## ***I/M Summary***

- Philadelphia required to use high enhanced program
- Decentralized Network @ 100% credit, per NHS Act
- Complex mix of programmatic & technical elements to meet performance standard
- Comprehensive set of emissions tests
- New testing equipment required: BAR90, Pressure, Purge & Possibly ASM
- Program substantially reduces VOC, NOx and CO emissions despite VMT growth and aging vehicle population
- Refinements possible - quantum changes unlikely

## NON-TECHNICAL QUICK GUIDE

### Selected Program Parameters and Terminology for a Pennsylvania Enhanced Vehicle Inspection and Maintenance (I/M) Program

#### Anti-Tampering Tests (ALP)

Up to eight inspections or tests may be performed to ensure that the vehicle's systems which affect emissions have not been removed, improperly replaced, or disabled. Includes both visual and mechanical inspections. The more tests performed, the more emissions credit received.

#### Areas Where Test is Required (per 40 CFR Part 51)

Enhanced I/M required in [1] all urbanized Serious, Severe-15, Severe-17, and Extreme ozone non-attainment areas, and all metropolitan statistical areas of 100,000 population in 1990 in the Ozone Transport Regions (PA is part of the Northeast Ozone Transport Region), regardless of non-attainment status. Certain exceptions apply for areas with significant rural characteristics (population density less than 200 persons/sq. mile; up to 50% of the population may be excluded in such MSAs). Coverage is required for the urbanized area in serious and worse areas, although this may be smaller than the non-attainment area.

Note that EPA has relaxed the original rules for areas which can demonstrate that a less stringent I/M program is sufficient to meet pollution and associated health standards (low enhanced I/M program as proposed for 20 counties outside Philadelphia area), and that the NE OTR may have its own set of criteria revised in an upcoming rule revision (called the OTC low enhanced I/M program).

#### Centralized Testing System (also known as test-only)

System in which vehicles must be inspected at a facility which only performs I/M tests. The facility is not permitted to provide vehicle repair services of any kind. Receives maximum EPA emissions credit.

#### Compliance Rate

Proportion of vehicles subject to the program which are actually tested and eventually issued a certificate of compliance or a waiver. EPA performance standard: 96%. A higher rate may necessitate additional vehicle registration, monitoring, or enforcement activities.

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*All terminology is non-technical and is not to be substituted for official definitions.*

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### Test Types (cont.)

- ASM, the acceleration simulation mode test - simulates a driving cycle using less expensive equipment, but is not as accurate or precise as the IM240 test. EPA requires more stringent cutpoints when using the ASM test than those in the IM240 test. This is a mass based test. There are several variants of the ASM test, such as ASM5015 (50 means 50% load factor; 15 means up to 15 mph).

DC240, the constant speed 240 test - simplified version of the IM240 test using less